

JOURNAL OF INSECT BEHAVIOR—Volume 9, 1996

Journal of Insect Behavior is an international forum for the publication of peer-reviewed original research papers and critical reviews on all aspects of the behavior of insects and other terrestrial arthropods, including (but not limited to): motor patterns and orientation; quantitative ethology; social behavior; behavioral ecology; neurophysiology of behavioral responses; pharmacological probes into behavior; genetic and developmental determinants; and theoretical, mathematical, and computer models of behavioral systems. *Journal of Insect Behavior* also publishes Short Communications, which are either brief theoretical or empirical papers on insect behavior or constructive critiques of recent published papers in this field, especially those in response to papers published in the journal. Thus, *Journal of Insect Behavior* is a forum not only for original research findings, but also for the free exchange of ideas and views based on those findings.

EDITORS

William J. Bell
Department of Entomology
University of Kansas
Lawrence, Kansas

Thomas L. Payne
Ohio State University
Wooster, Ohio

EDITORIAL BOARD

Winston J. Bailey, University of Western Australia, Nedlands, Perth, Australia
Friedrich G. Barth, Universität Wien, Wien, Germany
Guy Beugnon, Université Paul-Sabatier, Toulouse Cédex, France
Martin C. Birch, University of Oxford, Oxford, United Kingdom
Christine R. Boake, University of Tennessee, Knoxville, Tennessee
Michael D. Breed, University of Colorado, Boulder, Colorado
William H. Cade, Brock University, St. Catharines, Ontario, Canada
Jae Chun Choe, Seoul National University, Seoul, Korea
Hugh Dingle, University of California, Davis, California
A. F. G. Dixon, University of East Anglia, Norwich, United Kingdom
Bert Holldobler, Theodor-Boveri-Institut, Würzburg, Germany
Kenneth Y. Kaneshiro, University of Hawaii, Honolulu, Hawaii
J. C. van Lenteren, Wageningen Agricultural University, Wageningen, The Netherlands
Robert W. Matthews, University of Georgia, Athens, Georgia
Therese Ann Markow, Arizona State University, Tempe, Arizona
Charles D. Michener, University of Kansas, Lawrence, Kansas
James R. Miller, Michigan State University, East Lansing, Michigan
Daniel Papaj, University of Arizona, Tucson, Arizona
Michael R. Strand, University of Wisconsin, Madison, Wisconsin
James F. A. Traniello, Boston University, Boston, Massachusetts
Yoshitaka Tsubaki, National Institute for Environmental Studies, Onogawa, Tsukuba, Japan
Louise E. M. Vet, Wageningen Agricultural University, Wageningen, The Netherlands
Thomas J. Walker, University of Florida, Gainesville, Florida
Deborah A. Waller, Old Dominion University, Norfolk, Virginia
Diana E. Wheeler, University of Arizona, Tucson, Arizona
Mark Winston, Simon Frazier University, Burnaby, British Columbia, Canada

Journal of Insect Behavior is published bimonthly by Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013. *Journal of Insect Behavior* is abstracted or indexed in Animal Behavior Abstracts, Automatic Subject Citation Alert, BIOSIS (Biosciences Information Service), Current Awareness in Biological Sciences, Current Awareness in Biological Sciences International, Current Contents, Entomology Abstracts, Psychological Abstracts, PsycINFO Database, and PsycLIT. © 1996 Plenum Publishing Corporation. *Journal of Insect Behavior* participates in the Copyright Clearance Center (CCC) Transactional Reporting Service. The appearance of a code line at the bottom of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use. However, this consent is given on the condition that the copier pay the flat fee of \$9.50 per copy per article (no additional per-page fees) directly to the Copyright Clearance Center, Inc., 222 Rosewood Drive, Danvers, Massachusetts 01923, for all copying not explicitly permitted by Sections 107 or 108 of the U.S. Copyright Law. The CCC is a nonprofit clearinghouse for the payment of photocopying fees by libraries and other users registered with the CCC. Therefore, this consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale, nor to the reprinting of figures, tables, and text excerpts. 0892-7553/96 \$9.50

Advertising inquiries should be addressed to Advertising Sales, Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013-1578—telephone (212) 620-8495 and fax (212) 647-1898.

Subscription inquiries and subscription orders should be addressed to the publisher at Subscription Department, Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013 or faxed to the Subscription Department at its number (212) 807-1047, or may be telephoned to the Subscription Department's Journal Customer Service at (212) 620-8468, -8470, -8472, or -8082. Subscription rates:

Volume 9, 1996 (6 issues) \$275.00 (outside the U.S., \$325.00). Price for individual subscribers certifying that the journal is for their personal use, \$58.00 (outside the U.S., \$68.00).

Volume 10, 1997 (6 issues) \$315.00 (outside the U.S., \$370.00). Price for individual subscribers certifying that the journal is for their personal use, \$61.00 (outside the U.S., \$71.00).

Postmaster: Send address changes to *Journal of Insect Behavior*, Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013.

Printed in the USA.

QL
496
-J65

Journal of Insect Behavior is published bimonthly by Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013. *Journal of Insect Behavior* is abstracted or indexed in Animal Behavior Abstracts, Automatic Subject Citation Alert, BIOSIS (Biosciences Information Service), Current Awareness in Biological Sciences, Current Awareness in Biological Sciences International, Current Contents, Entomology Abstracts, Psychological Abstracts, Psycinfo Database, and PsycLIT. © 1996 Plenum Publishing Corporation. *Journal of Insect Behavior* participates in the Copyright Clearance Center (CCC) Transactional Reporting Service. The appearance of a code line at the bottom of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use. However, this consent is given on the condition that the copier pay the flat fee of \$9.50 per copy per article (no additional per-page fees) directly to the Copyright Clearance Center, Inc., 222 Rosewood Drive, Danvers, Massachusetts 01923, for all copying not explicitly permitted by Sections 107 or 108 of the U.S. Copyright Law. The CCC is a nonprofit clearinghouse for the payment of photocopying fees by libraries and other users registered with the CCC. Therefore, this consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale, nor to the reprinting of figures, tables, and text excerpts. 0892-7553/96 \$9.50

Advertising inquiries should be addressed to Advertising Sales, Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013-1578—telephone (212) 620-8495 and fax (212) 647-1898.

CONTENTS

Important Announcement	1
Leafhoppers on Leaves: An Analysis of Feeding Behavior Using Conditional Probabilities <i>Astri C. Wayadande and Lowell R. Nault</i>	3
Factors Regulating Predation by First-Instar Spined Assassin Bugs [<i>Sinea diadema</i> (Fabricius)] (Hemiptera: Reduviidae) <i>J. R. Taylor and J. M. Schmidt</i>	23
The Effect of Hunger on Intraspecific Interactions Between First-Instar <i>Sinea diadema</i> (Hemiptera: Reduviidae) <i>J. R. Taylor and J. M. Schmidt</i>	37
Mating Behavior of <i>Phytoecia rufiventris</i> Gautier (Coleoptera: Cerambycidae) <i>Qiao Wang, Li-yuan Chen, Jin-song Li, and Xin-ming Yin</i>	47
Polyethism and the Adaptiveness of Worker Size Variation in the Attine Ant <i>Trachymyrmex septentrionalis</i> <i>Samuel N. Beshers and James F. A. Traniello</i>	61
Maternal Behavior and Clutch Manipulation in the Ring-Legged Earwig (Dermaptera: Carcinophoridae) <i>Susan M. Rankin, Sarah K. Storm, Dana L. Pioto, and Andrea L. Risser</i>	85
Intraspecific Nest Parasitism in the Sand Wasp <i>Stictia heros</i> (Fabr.) (Hymenoptera: Sphecidae) <i>Ethel M. Villalobos and Todd E. Shelly</i>	105
Odor Preference in Honeybees as a Function of Amount of Reward: Tests of Two Explanations <i>James S. Hoban, P. A. Couvillon, and M. E. Bitterman</i>	121
Localization of Mating Behavior of Released <i>Bactrocera dorsalis</i> Flies on Host Fruit in an Orchard <i>Ronald J. Prokopy, Ratana Poramarcom, Manon Sutantawong, Ranu Dokmaihom, and Jorge Hendrichs</i>	133
Behavioral Strategies of Aphid Hyperparasitoids to Escape Aggression by Honeydew-Collecting Ants <i>Gerhard Hübner and Wolfgang Völkl</i>	143
SHORT COMMUNICATION	
Dragonflies (<i>Gynacantha nervosa</i> Rambur) Avoid Wasps (<i>Polybia aequatorialis</i> Zavattari and <i>Mischocyttarus</i> sp.) As Prey <i>Sean O'Donnell</i>	159

CONTENTS

Do Bumblebees (Hymenoptera: Apidae) Really Forage Close to Their Nests? <i>W. E. Dramstad</i>	163
Function of Abdomen Wave Behavior in Larval <i>Ischnura verticalis</i> (Odonata: Coenagrionidae) <i>Jean M. L. Richardson and Robert L. Baker</i>	183
Pheromonal Emission During the Mating Behavior of <i>Eurycotis floridana</i> (Walker) (Dictyoptera: Blattidae) <i>J. P. Farine, Cl. Everaerts, D. Abed, M. Ntari, and R. Brossut</i>	197
Effect of Carbohydrate on Age-Related Feeding Behaviors and Longevity in Adult Black Cutworm, <i>Agrotis ipsilon</i> (Lepidoptera: Noctuidae) <i>Bradley F. Binder</i>	215
Allocation of Searching Time Within the Soybean Canopy by Parasitoids Attacking the Green Cloverworm <i>M. E. Baur, K. V. Yeorgan, and P. L. Cornelius</i>	223
Behavioral Responses of Three Species of Ground Beetle (Coleoptera: Carabidae) to Olfactory Cues Associated with Prey and Habitat <i>J. P. Kiely, L. J. Allen-Williams, N. Underwood, and E. A. Eastwood</i>	237
Sex Ratio Regulation in the Wasp <i>Eupelmus vuilleti</i> (crwf.), an Ectoparasitoid on Bean Weevil Larvae (Hymenoptera: Pteromalidae) <i>C. Terrasse, B. Nowbahari, and D. Rojas-Rousse</i>	251
The Role of Learning in Adult Food Location by the Larval Parasitoid, <i>Microplitis croceipes</i> (Hymenoptera: Braconidae) <i>Keiji Takasu and W. J. Lewis</i>	265
Time Allocation of the Parasitoid <i>Aphidius colemani</i> (Hymenoptera: Aphidiidae) Foraging for <i>Aphis gossypii</i> (Hymenoptera: Aphidae) on Cucumber Leaves <i>M. J. van Steenis, K. A. M. H. El-Khawass, L. Hemerik, and J. C. van Lenteren</i>	283
Host Nest Preference and Nest Choice in the Cuckoo Paper Wasp <i>Polistes sulcifer</i> (Hymenoptera: Vespidae) <i>R. Cervo and S. Turillazzi</i>	297
The Sexual Arms Race and Phenotypic Correlates of Mating Success in the Waterstrider, <i>Aquarius remigis</i> (Hemiptera: Gerridae) <i>I. Weigensberg and D. J. Fairbairn</i>	307
Timing of Mate-Locating by Males in Relation to Female Activity in the Carpenter Bee <i>Xylocopa varipuncta</i> (Hymenoptera: Apidae) <i>John Alcock</i>	321
Size-Related Sexual Selection and Yeast Diet in <i>Drosophila buzzatti</i> (Diptera: Drosophilidae) <i>Fabian M. Norry and Juan C. Vilardi</i>	329
Flight Activity of <i>Prostephanus truncatus</i> (Horn) (Coleoptera: Bostrichidae) in Relation to Population Density, Resource Quality, Age, and Sex <i>Henry Y. Fadamiro, Tristram D. Wyatt, and Martin C. Birch</i>	339

CONTENTS

The Egg Capitulum of a Neotropical Walkingstick, <i>Calynda bicuspis</i> , Induces Aboveground Egg Dispersal by the Ponerine Ant, <i>Ectatomma ruidum</i>	353
<i>Donald M. Windsor, Dorset W. Trapnell, and German Amat</i>	
Body Size Influences Mating Success of the Eucalyptus Longhorned Borer (Coleoptera: Cerambycidae)	369
<i>Lawrence M. Hanks, Jocelyn G. Millar, and Timothy D. Paine</i>	
Mating Behavior of the Eucalyptus Longhorned Borer (Coleoptera: Cerambycidae) and the Adaptive Significance of Long "Horns"	383
<i>Lawrence M. Hanks, Jocelyn G. Millar, and Timothy D. Paine</i>	
Springtail Postmolt Vulnerability to Pseudoscorpion Predation: Mechanisms and Implications	395
<i>D. L. Witt and L. M. Dill</i>	
Do Damselfly Larvae Recognize and Differentially Respond to Distinct Categories of Macroinvertebrates?	407
<i>Lawrence R. Shaffer and James V. Robinson</i>	
Intranidal Mating, Emergence, and Sex Ratio in a Communal Bee <i>Andrena jacobi</i> Perkins 1921 (Hymenoptera: Andrenidae)	421
<i>R. J. Paxton and J. Tengö</i>	
Regulation of Reproduction in the Neotropical Ponerine Ant, <i>Pachycondyla villosa</i>	441
<i>J. Heinze, B. Trunzer, P. S. Oliveira, and B. Hölldobler</i>	
The Effects of Season, Pretraining, and Scent on the Efficiency of Traps for Capturing Recruited Honey Bees (Hymenoptera: Apidae)	451
<i>Keith D. Waddington, Harald Esch, and John E. Burns</i>	
Effects of Chlorogenic Acid- and Tomatine-Fed Caterpillars on the Behavior of an Insect Predator	461
<i>Matthew S. Traugott and Nancy E. Stamp</i>	
Natural Selection in the Laboratory for a Change in Resistance by <i>Drosophila melanogaster</i> to the Parasitoid Wasp <i>Asobara tabida</i>	477
<i>Kimberley Hughes and Marla B. Sokolowski</i>	
Floating and Fidelity in Nest Visitation by <i>Crawfordapis luctuosa</i> (Hymenoptera: Colletidae)	493
<i>Yikweon Jang, Clare T. Wuellner, and Christina S. Scott</i>	
Female Wing Spreading as Acceptance Signal in the <i>Drosophila virilis</i> Group of Species	505
<i>Mirka Vuoristo, Eija Isoherranen, and Anneli Hoikkala</i>	
SHORT COMMUNICATION	
Males of a Mite, <i>Macrocheles muscaedomesticae</i> , Estimate a Female's Value on the Basis of Her Age and Reproductive Status	517
<i>Yukio Yasui</i>	

CONTENTS

- Innate Responses of the Parasitoids *Cotesia glomerata* and
C. rubecula (Hymenoptera: Braconidae) to Volatiles
from Different Plant-Herbivore Complexes 525
Jacqueline B. F. Geervliet, Louise E. M. Vet, and Marcel Dicke
- The Influence of Brood Type on Activity Cycles in *Leptothorax*
allardycei (Hymenoptera: Formicidae) 539
Blaine J. Cole and Laraine Hoeg
- A Study of Nonrandom Mating in a British Population of the
Two-Spot Ladybird with a High Frequency of the
Melanic Morph 549
I. P. M. Tomlinson
- Does Behavioral Flexibility Compensate or Constrain Colony
Productivity? Relationship Among Age Structure, Labor
Allocation, and Production of Workers in Ant Colonies 557
Kensuke Nakata
- Effects of Recent Experience on Foraging in Tephritid Fruit Flies 571
*A. L. Averill, R. J. Prokopy, M. M. Sylvia, P. P. Connor, and
T. T. Y. Wong*
- Marking of Host Fruit by Male *Rhagoletis boycei* Cresson Flies
(Diptera: Tephritidae) and Its Effect on Egg-Laying 585
D. R. Papaj, J. M. García, and H. Alonso-Pimentel
- Mate Choice and Competition in the Barklouse *Lepinotus patruelis*
(Psocoptera: Trogiidae): The Effect of Diet Quality and
Sex Ratio 599
Judy Wearing-Wilde
- Prey Preferences of *Portia fimbriata*, an Araneophagic,
Web-Building Jumping Spider (Araneae: Salticidae) from
Queensland 613
Daiqin Li and Robert R. Jackson
- Parasitism Rates in Relation to Nest Site in Bees and Wasps
(Hymenoptera: Apoidea) 643
William T. Wcislo
- Books Received for Review 657

CONTENTS

- Giving-up Time Variation in Response to Differences in Nectar
Volume and Concentration in the Giant Tropical Ant,
Paraponera clavata (Hymenoptera: Formicidae) 659
*Michael D. Breed, Rachel M. Bowden, Melissa F. Garry, and
Aric L. Weicker*
- Individual Constancy of Local Search Strategies in the Giant Tropical
Ant, *Paraponera clavata* (Hymenoptera: Formicidae) 673
*Michael D. Breed, Christian Stierstorfer, Ellen D. Furness,
Joseph M. Jeral, and Jennifer H. Fewell*
- The Ovipositional Behavior of *Aphidius ervi* and *Monoctonus
paulensis* (Hymenoptera: Aphididae) Encountering
Different Host Species (Homoptera: Aphididae) in
Sequential Patches 683
J. P. Michaud
- Attraction of a Kleptoparasitic Sphaerocerid Fly (*Norrbomia
frigipennis*) to Dung Beetles (*Phanaeus* spp. and
Canthon sp.) 695
E. Petersson and J. Sivinski
- Postpharyngeal Gland Secretion as a Modifier of Aggressive
Behavior in the Myrmicine Ant *Manica rubida* 709
*Abraham Hefetz, Christine Errard, Alice Chambris, and
Alain Le Negrate*
- Body Size, Male Aggression, and Male Mating Success in the
Cottonwood Borer, *Plectrodera scalator* (Coleoptera:
Cerambycidae) 719
*Steven K. Goldsmith, Zoe Stewart, Stacie Adams, and
Angela Trimble*
- Female Receptivity and Male Mate-Guarding in the Jewel Spider
Gasteracantha minax Thorell (Araneidae) 729
Mark A. Elgar and Rachael Bathgate
- Epigamic Display and Unique Mating Position in *Wyeomyia
arthrostigma* (Diptera: Culicidae) 739
*T. Keith Phillips, Robert G. Hancock, and
Woodbridge A. Foster*

Age- and Density-Related Oviposition Behavior of the European Corn Borer, <i>Ostrinia nubilalis</i> (Lepidoptera: Pyralidae) <i>Bradley F. Binder and James C. Robbins</i>	755
Analysis of Foraging Behavior of the Whitefly Parasitoid <i>Encarsia formosa</i> (Hymenoptera: Aphelinidae) in an Experimental Arena: A Simulation Study <i>H. J. W. van Roermund, J. C. van Lenteren, and R. Rabbinge</i>	771
Intraspecific Interactions in a Community of Arboreal Nesting Termites (Isoptera: Termitidae) <i>Maurice Leponce, Yves Roisin, and Jacques M. Pasteels</i>	799
Influence of Age and Environmental Factors on Burrow-Making Behavior of the Short-Tailed Cricket, <i>Anurogryllus muticus</i> (De Geer) (Orthoptera: Gryllidae) <i>How-Jing Lee and Werner Loher</i>	819
<i>Short Communication</i>	
The Functional Significance of Tibial Displays in the Damselfly <i>Platycypha caligata</i> (Selys) (Odonata: Chlorocyphidae) <i>Steven R. Telford, Mandy Barnett, and Daniel A. Polakow</i>	835

CONTENTS

- The Effect of Variation in Parameters of the Male Calling Song of the Katydid, *Amblycorypha parvipennis* (Orthoptera: Tettigoniidae), on Female Phonotaxis and Phonoresponse 841
Patrick L. Galliard and Kenneth C. Shaw
- Nest Surface Hydrocarbons Facilitate Nestmate Recognition for the Social Wasp, *Polistes metricus* Say (Hymenoptera: Vespidae) 857
Theresa L. Singer and Karl E. Espelie
- Courtship Behavior and Discrimination Between Potential Mates by Male *Delia antiqua* (Diptera: Anthomyiidae) 871
R. S. McDonald and J. H. Borden
- Oviposition Site Selection by the Diamondback Moth, *Plutella xylostella* (L.) (Lepidoptera: Plutellidae) 887
K. A. Justus and B. K. Mitchell
- Host-Finding by Cabbage Looper Moths (Lepidoptera: Noctuidae): Learning of Host Odor upon Contact with Host Foliage 899
Peter J. Landolt and Oscar Molina
- Ultrasonic Signals in the Defense and Courtship of *Euchaetes egle* Drury and *E. bolteri* Stretch (Lepidoptera: Arctiidae) 909
Rebecca B. Simmons and William E. Conner
- Seasonal Variation in Mate-Locating Activity in the Desert Hackberry Butterfly (*Asterocampa leilia*; Lepidoptera: Nymphalidae) 921
Ronald L. Rutowski, Michael J. Demlong, and Barbara Terkanian
- Response of the Melon Fly Parasitoid *Pystallia fletcheri* (Hymenoptera: Braconidae) to Host-Habitat Stimuli 933
R. H. Messing, L. M. Klungness, E. B. Jang, and K. A. Nishijima
- Reinforcement Mechanisms of Olfactory Conditioning During Parasitization by the Parasitoid *Brachymeria intermedia* (Hymenoptera: Chalcididae) 947
V. Kerguelen and R. T. Cardé

SHORT COMMUNICATIONS

Learning of Leaf Shape by Pipevine Swallowtail Butterflies: A Test Using Artificial Leaf Models <i>R. A. Allard and D. R. Papaj</i>	961
On the Evolutionary Origin of Nuptial Seminal Gifts in Insects <i>Carlos Cordero</i>	969
"Sacking" the Host: Oviposition Behavior of a Parasitoid Wasp, <i>Dyscritulus planiceps</i> (Hymenoptera: Aphidiidae) <i>W. Völkl and M. Mackauer</i>	975
An Unusual Behavior in <i>Helicoverpa armigera</i> Hübner (Lepidoptera: Noctuidae): Pupation Inside Tomato Fruits <i>Luis M. Torres-Vila, María C. Rodríguez-Molina, and Alfredo Lacasa</i>	981
AUTHOR INDEX	985
SUBJECT INDEX	987
